Research Priorities on Safety of Complementary Feeding

Introduction

With the introduction of complementary foods, infants are at risk of exposure to foodborne pathogens. Contamination of food (including drinking water) with microbial agents has been recognized as one of the leading causes of diarrhea diseases and ill health in infants. It is estimated that annually, some 1.8 million children die from the direct effect of diarrheal diseases. However, many more are affected by the effects associated with diarrheal diseases and malnutrition. It is estimated that annually some 13 million children under 5 years old die in developing countries, mostly from the associated effects of malnutrition and infections. In 1995, out of 11.6 million deaths among children <5, 19% were estimated to have resulted from diarrhea and 34% were associated with malnutrition.

Foodborne diseases manifest themselves through a wide a range of symptoms, eg, diarrhea, vomiting, abdominal pain, fever, and jaundice with potentially severe and long-lasting damage to health.

Foodborne infections can cause anorexia. A poor food intake, aggravated by the loss of nutrients from vomiting, diarrhea, malabsorption, and fever over an extended period of time, will lead to nutritional deficiencies with serious consequences for the growth and immune system of infants and children.

Numerous studies have indicated that a great proportion of diarrhea and other foodborne diseases are due to unhygienic preparation of foods in households. The sources of food contamination are varied (see Fig 1). They include night soil, polluted water, flies, pests, domestic animals, unclean utensils and pots, food handlers (eg, soiled hands), dust, and dirt. Raw foods themselves are frequently a source of contaminants as some may naturally harbor pathogens or come from infected animals. Moreover, during food preparation and storage there is an added risk of cross-contamination as well as an opportunity for pathogenic bacteria to multiply. A careful analysis of foodborne diseases has shown that in particular 2 errors in food preparation increase the risk because they permit the survival and growth of pathogens to disease-causing levels. The first is the preparation of food several hours before consumption, which, combined with its storage at ambient temperatures favors growth of pathogens or formation of toxins, or both. The second error is that of having insufficient cooling of foods or subsequently, inadequate reheating of food to reduce or eliminate pathogens.

There are a number of factors that lead to poor hygienic practices, such as:

- Food habits and beliefs. In many instances caregivers are not fully aware of the principles of food hygiene, or fail to recognize the relationship between diarrhea and food contamination. Customary practices are also sometimes incompatible with the principles of food safety.
- Inadequate supply of water and lack of sanitation facilities increases the likelihood of food contamination.
- Food shortage or poverty. The availability or low price of food is given priority to the detriment of quality and the safety aspects often neglected.
- The shortage of fuel and the lack of cold storage facilities and time results in the preparation of large quantities of food, which is often insufficiently cooked and stored at ambient temperatures and consumed at subsequent meals throughout the day.

To address these problems, well-designed programs for health education in food safety of caregivers through health workers is fundamental. The design of such programs should focus on critical control measures during food preparation and should take into consideration the sociocultural and socioeconomic factors leading to foodborne diseases. To this end, the food preparation habits of caregivers should be studied using the Hazard Analysis and Critical Control Point system (HACCP) as a methodology and investigating the sociocultural and socioeconomic factors through anthropological studies. Furthermore, the impact and efficacy of health education interventions need to be evaluated and, if needed, improved.

Research Questions

1. What are the relative roles of food preparation, availability of drinking water, and sanitation in the transmission of diarrheal diseases?

Traditionally, poor sanitation and a contaminated water supply have been considered the major cause of diarrheal diseases. There is a need to reexamine this issue from a wider perspective where

![Fig 1. Sources of contamination of complementary foods.](image-url)
factors related to food and its preparation are equally and ade-
quately considered. Presently, it is not clear what proportion of
diarrheal diseases is attributable due to food and its preparation,
as opposed to other factors such as availability of drinking water
and poor sanitation. This issue should be examined in both rural
and urban settings as well as at different social levels, in particular
in households with high incidences of diarrheal diseases. Such
studies could also determine which practices in food preparation
present greater risk of chemical or microbial contamination.
2. What are the social, cultural, and economic factors affecting
adversely the safety of foods prepared for infants and young
children?
Studies on risk perception, know-how, beliefs, practices of care-
givers in food safety, and other socioeconomic barriers to the
preparation of safe complementary foods, conducted in different
settings, can shed light on the needs of the caregivers and help
formulate appropriate health education interventions. Data col-
lected through such studies should be combined with the findings
of HACCP studies on errors in hygienic practices (see above) to
develop health education interventions.
3. What is the impact of health education in food safety on the
hygienic quality of complementary foods and the incidence of
diarrheal diseases and ill health in infants and young children?
Very few studies have been conducted on the efficacy of health
education interventions in improving food safety and preventing
diarrheal diseases. Yet, such studies are essential for improving
health education interventions. Evaluation of the health education
interventions and collection of data on factors leading to their
success or failure are important research priorities in the area of
safety of infant feeding. In conducting such studies, it is important
to plan and evaluate the health education interventions in the light
of past experience and data collected through research work out-
lined in research questions 1 and 2 above.

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REFERENCES
1. World Health Organization. WHO Global Database on Child Growth and
2. Motarjemi Y. Contaminated weaning food: a major risk factor for diar-
rhoes and associated malnutrition. Bull World Health Organ. 1993;71:
79–92
to Identifying and Assessing Risks Associated With Food Preparation and
Research Priorities on Safety of Complementary Feeding

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